SPECIFICATION

Docket No. BAPROD-42296

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN that I, Christopher B. Barley, a citizen of the United States of America, residing in the State of Texas, have invented new and useful improvements in an

IMPROVED FEED DISPENSER

of which the following is a specification:

CROSS-REFERENCE TO RELATED APPLICATION

The present application claims priority from United States Provisional Application No. 60/459,383, filed 31 March 2003, the entirety of which is hereby incorporated by reference hereinto.

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention relates generally to feeder equipment, and more specifically to a wide dispersal animal feeder.

2. Description of the Prior Art:

As known in the prior art, it is sometimes desirable to provide a feeder device that widely disperses animal feed over a relatively broad area. One example of a use for this type of feeder is to provide food to fish. A feeder, resting on shore or otherwise near the water is used to disperse fish food over the surface of the water. Similar feeders provide food, usually in pellet form, to various types of wildlife.

Presently used feeder equipment has a number of drawbacks. Programming the equipment to operate on a desired feeding schedule is often not possible, and the feeding schedule must be changed to

accommodate the feeder. Also, previously available feeders tend to jam with feed, particularly if it becomes moistened in the feeder.

It would be desirable to provide a feeder that can be flexibly programmed in order to allow feeding at a desired schedule. It would also be desirable for such a feeder to be designed in a manner that minimizes problems in operation caused by jamming of the feed in the feeder mechanism.

SUMMARY OF THE INVENTION

In accordance with the present invention, an improved feed dispenser is programmable to allow for a desired feeding schedule. When a feeding interval begins, a dispersion wheel begins operating. A separate spinner plate is used to block feed from the dispersion wheel, and begins operating to allow feed to the dispersion wheel only after a delay of several seconds after the dispersion wheel begins operation. In addition, the dispersion wheel is operated for another period of several seconds after the spinner plate ceases operation in order to clear the mechanism and prevent blockage.

BRIEF DESCRIPTION OF THE DRAWINGS

The following description is a preferred embodiment of the invention, and is used for illustrative purposes. The invention will be better understood by the following description taken together with the drawings, in which:

Figure 1 is a schematic cross section of a preferred embodiment of the invention;

Figure 2 is a perspective view of a preferred spinner plate; and

Figure 3 is a timing diagram showing operation of a preferred control circuit.

DETAILED DESCRIPTION OF THE INVENTION

As will be appreciated by those skilled in the art, the following description of a preferred embodiment is illustrative rather than limiting. Additional features may be added to a feed device without changing the nature of the invention, and various alternative design details will become apparent to those skilled in the art.

Referring to Figure 1, a partially cut-away view of a preferred hopper 10 is disclosed. The hopper unit 10 has a modified plan, so that the funnel is offset and sloped on only three sides. Sidewall 12 is vertical while the other three sides have sloped lower portions. Right side wall 14 has a sloped lower portion 16 to direct feed pellets toward opening 18. The front and back walls, parallel to the plane of the Figure, each have lower sloped portions 20 to likewise direct feed pellets toward opening 18.

A spinner plate mechanism 22 is located slightly below opening 18 in the funnel of the hopper 10, and the hopper 10 is connected to a lower dispersal unit 24 through a funnel system 26. The lower dispersal unit 24 includes a relatively high speed, vertically mounted, spinning paddle wheel 28 that throws feed pellets out through an opening (not shown) in the front of the feeder unit. The spinner plate mechanism 22 operates to allow feed to leave the hopper 10 and travel through the funnel system 26 to the lower dispersal unit 28 only when the spinner plate 30 operates. In other words,

when the spinner plate 30 is stopped, the opening 18 is blocked; when the spinner plate 30 spins, feed is allowed to drop into the funnel system 26.

A dual electronic control circuit 32 includes a programmable timer, and operates the spinner plate mechanism 22 and lower dispersal unit 28. Both the spinner plate mechanism 22 and lower dispersal unit 28 use electric motors, preferably a 6 volt motor 34 for the spinner plate 30 that operates at a reduced rate, and a 12 volt motor 36 for the paddle wheel 28 that operates at full capacity. Operation of the device is therefore completely controlled by the controller circuitry 32. Preferably, the paddle wheel 28 spins at a rate exceeding approximately 2000 rpm in order to disperse the feed pellets. The spinner plate 30 preferably spins as a slower rate so that feed is provided to the paddle wheel 28 at a measured rate.

Control circuit 32 is preferably a programmable controller programmed to operate in accordance with the following description. It is user programmable to operate multiple times during a day, with six or eight separate feeding cycles being common. The duration of each feeding cycle is also set by the user. In addition, the controller 32 is programmed to operate the spinner plate 30 and paddle wheel 28 separately, as described below, in order to provide operating characteristics for the device. The timing of operation for the spinner 30 and paddle wheel 28 are not normally under user control, but if desired can be made so in order to accommodate unusual circumstances.

The device functions as follows. The hopper 10 is filled with some type of pellet feed to a desired level. The timer of the control circuit 32 is programmed to define the number of times per day the feeder is to disperse feed, and for the duration of each feeding event. For example, the timer can be programmed to disperse feed between one and eight times per day, and each feeding session can have, for example, a duration of between 1 and 90 seconds.

Once this information has been programmed in, the feeder is left to run unattended. Each time the timer indicates that the time for a feeding session has arrived, the paddle wheel mechanism 24 begins rotating the paddle wheel 28 in order for it to achieve full rotational speed. This happens in less than approximately 4 seconds.

After a 4 second delay has occurred, allowing the paddle wheel 28 to come up to speed, the spinner plate mechanism 22 is engaged for the duration set on the timer. Operation of the spinner plate 30 causes feed to drop through the funnel system 26 and be dispersed by the paddle wheel 28. Once the runtime is expired, the spinner plate mechanism 22 stops operating, again blocking flow of feed pellets out of the hopper 10.

After the spinner plate 30 stops rotating, the paddle wheel mechanism 24 continues to operate for a short period of time to ensure that the funnel system 26 and lower dispersal unit are completely cleared of pellet feed. In the preferred embodiment, a 4 second additional runtime is sufficient to

ensure that all feed is cleared from the mechanism. At this time, the cycle is complete, and the timer shuts down the device to await the next dispersal event.

Because water or condensation can cause the feed to swell up and jam parts of the system, drainage holes 40 are provided at several locations, and particularly in the lower dispersal unit, to ensure that any water that reaches the interior of the device, or condensation that occurs, is drained out through the bottom of the device. The continued running of the paddle wheel dispersal unit 24 for a short period of time after the feeding of pellets ceases also ensures that pellets are not left behind in the system to absorb water and block operation in the future.

Referring to Figure 2, the diagram illustrates a preferred shape for the spinner plate 30. The spinner plate 30 is mounted with a vertical axis, and rotated by an electric motor 24 as previously described. As shown in the drawing, the spinner plate 30 has two edges 42, 44 that are folded downwardly, and two edges 46, 48 that a folded upwardly. Folding of the edges in this manner causes a certain amount of agitation of feed pellets resting on the plate after they come through the hopper. However, the plate is mounted close enough to the opening 18 at the bottom of the hopper unit that, when the plate is motionless, the flow of pellets is blocked. The distance between a spinner plate and the opening can be adjusted to be appropriate for the size of the feed pellets being used. In general, larger

pellets will require the spinner plate mechanism 22 to be lowered, while smaller pellets will require the spinner plate 30 to be raised in order to be closer to the opening.

It will be appreciated by those skilled in the art that numerous other designs of the spinner plate can be used. The only requirement is that the spinner plate operates to block the opening and prevent the flow of feed pellets when it is not rotating, and allow feed pellets to be passed to the lower dispersal unit when it rotates.

Figure 3 is a timing diagram showing typical functioning of the device during a single feeding cycle. The cycle begins at time 50, at which time controller 32 starts motor 36, which drives paddle wheel 28. The paddle wheel comes up to speed over a delay of a few seconds. After an appropriate delay, shown here as 4 seconds, motor 34 begins operation. The delay may be varied depending on the characteristics of the motor 36, but four seconds is sufficient in most cases.

When motor 34 begins operation, feed pellets begin moving through the system. Motor 34 stays on for a feed period programmed by the user, shown in the Figure as time *t*. Once duration *t* has expired, motor 34 is turned off, and feed pellet flow ceases from the hopper. However, motor 36 continues operation for another four seconds in order to clear the device of pellets. As before, this delay can be changed to another value of needed to

ensure complete clearance of pellets. After the expiration of this second delay, motor 36 is turned off, and the cycle is complete.

Various changes can be made to the described feed device, as will be appreciated by those skilled in the art. Many of the details of the physical mechanism can be changed as necessary to suit particular applications.

The use of two motors as described, rather than using a solenoid driven gate to allow feed pellets to drop into the funnel system, helps eliminate jamming of pellets in the system. The spinner plate allow pellets to be dropped, but is not easily susceptible to jamming. In addition, the timing of operation of the paddle wheel motor relative to operation of the spinner motor also helps endure that excess feed pellets will be cleared from the device. This prevents most of the problems caused by pellets remaining in the device after the feeding cycle and causing jamming problems for later cycles.

While the invention has been shown in only one of its forms, it is not thus limited but is susceptible to various changes and modifications without departing from the spirit thereof.